MECHANICS' MAGAZINE,
Museum, Register, Journal and Gazette.

"The most valuable gift which the Hand of Science has ever yet offered to the Artisan." *Dr. Birkbeck.*

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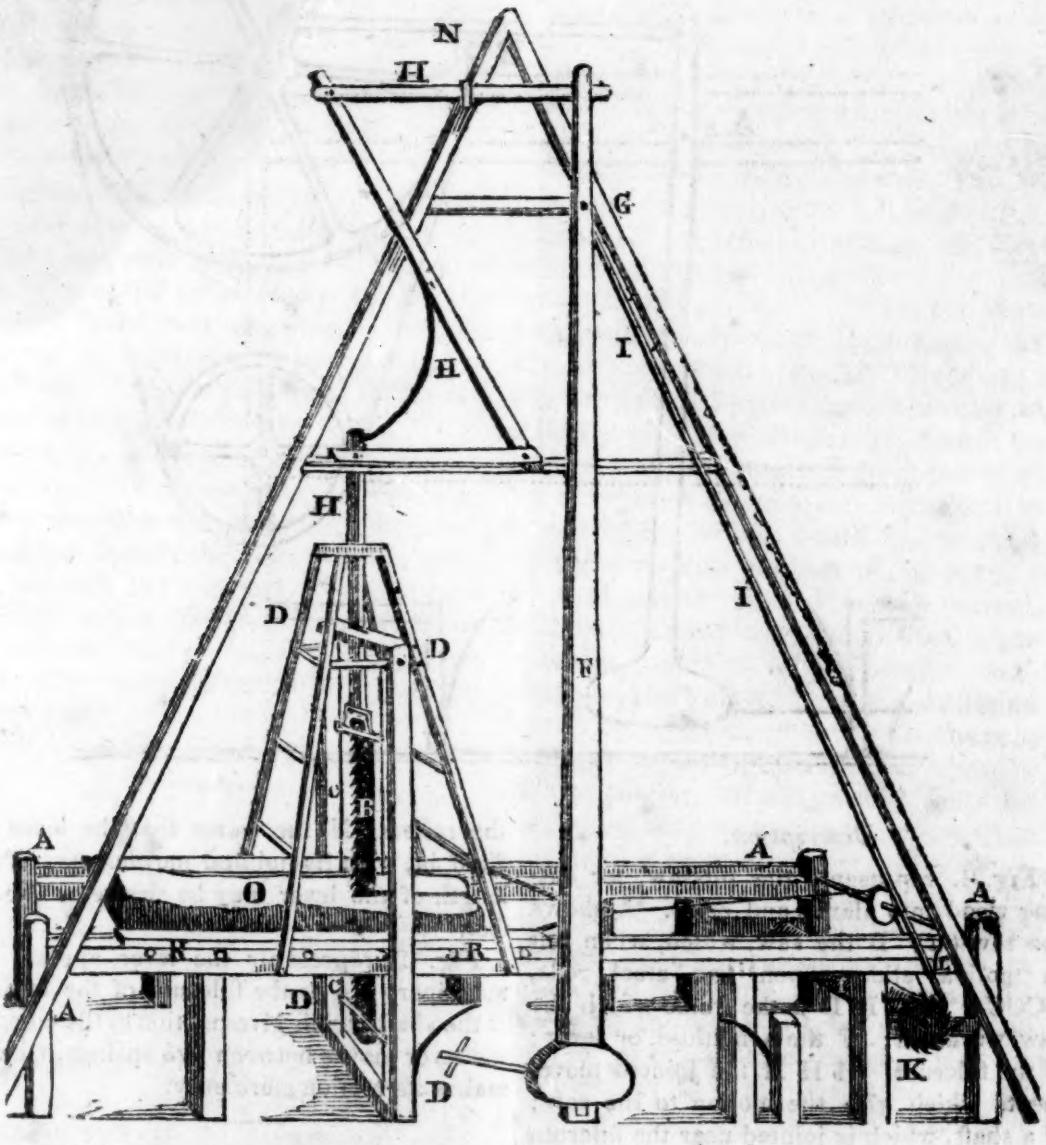
"They helped every one his neighbour, and every one said to his brother, Be of good courage. So the carpenter encouraged the goldsmith, and he that smootheth with the hammer him that smote the anvil, saying, It is ready for the soldering; and he fastened it with nails, that it should not be moved."—*Isaiah* xli 6, 7.

NEW PIT-SAW.

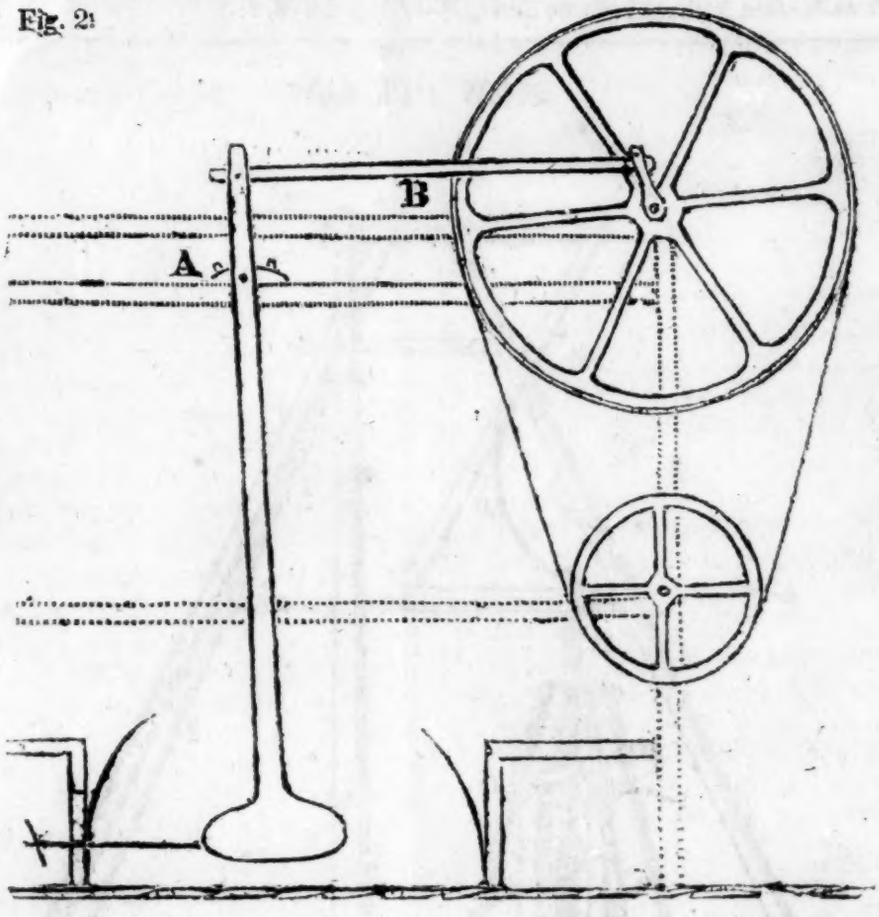


Sir,—You were pleased to insert, some time ago, a description of my new cross-cutting saw. I now lay before you another contrivance of mine, of a pit-saw, for cutting wood into planks and deals, which is wrought by the same power, namely, a pendulum or lever. When the wood to be sawed is fixed on the pit, all that is required is to keep the lever moving between two springs; and one man may do this with ease, with three or

four saws in the frame. I have also shown how the lever may be applied to other machinery, moving either with belts. chains, or teeth. The length and weight of the lever form its power, and these may be increased acording to the power that is required to drive the machine which it may be applied to. I have found by experiment, that a man with a lever, of the proper length and weight, will drive a machine that would require a two-horse power to do it. It is very laborious, in some cases, working at machines by a crank with the hand or foot, and the lever may be applied to such with great advantage.

DIXON VALANCE, Mechanic,
Liberton, Lanarkshire.

Fig. 2.



Description.

Fig. 1. represents the pit-saw, for cutting wood into planks and deals. A shows the saw-pit; B the saw, which, when put in motion, slides upon two steel rods, CCCC; D D D D is the frame which the saw works in; F the pendulum, or lever; G the fulcrum; H H H the jointed movements which give the motion to the saw; II a shaft, which is jointed near the fulcrum of the lever, and brings forward the wood to the saw, by turning round a windlass; K a rag-wheel, which is on the end of the windlass, by which the shaft, II, turns it round; L. a spring, to keep the shaft in the teeth of the rag-wheel; M a catch; O the wood fixed on the frame moving forward on rollers; R the rollers; N the frame that the lever is fixed in, with its jointed movements. The length of the lever may be twelve or fifteen feet.

Fig. 2. represents the lever applied to machinery; A is the fulcrum of the lever; B the shaft which gives motion to the wheel; the lever moves between two springs, which makes its motion more easy.

NEW MODE OF FULLING CLOTH.

Messrs. Northrup and Dillon, of New Jersey, North America, have proposed a method of fulling cloth without employing soap or any other alkaline matter, and without steam, in a much shorter time, and in a

more perfect manner than has been heretofore accomplished; their process is described as follows:

"After the oil has been removed from the cloth, it is to be dried. A composition is then made of rye flour and pure water, in the proportion of four quarts of the flour to eight gallons of water, which is to be boiled to the consistency of a thin paste, or the flour may be mixed in hot water.—The cloth is then to be made sufficiently wet with the paste (which may be applied either warm or cold,) and put into the same kind of fulling mills, and beat about, as is customary when soap or steam is used.—When the cloth has been sufficiently fulled in this manner, the paste is to be washed out or scoured with pure water.

"In the same manner a thin paste, made of wheat oats or barley flour, may be employed, and other vegetable substances of a similar nature may be used in the process of fulling with great advantage: the employment of vegetable matters, instead of animal matter, in the process of fulling, being the substance of the invention.

"By using these materials, the cloth becomes fulled to a proper thickness in a much shorter time than with soap; is softer, firmer, and less worn in the mill; costs (in America) one-fifth the expense of fulling with soap, and retains the colour of indigo blues, and all other colours that are dyed before fulling, in greater perfection than when soap is employed."

IDEA OF AN AIR ENGINE.

SIR,—I have long entertained an idea, that an engine might be so contrived, that it could be worked by a succession of powerful explosions of condensed air through a valve, on the principle of the air-gun; but I have given the subject more attention since steam engines were applied to propel vessels at sea, and since the distressing accidents that have occurred by the use of fire. In the ardent hope, however, that the following (I admit) crude suggestion may meet the eye, and attract the attention, of some person *qualified* to entertain the subject, I shall proceed to detail my ideas.

On the mere supposition that a force is required equal to the power of steam, to rapidly raise the lever of the engine, I propose that immediately under the piston of an engine there should be placed a large cylinder, capable of containing a sufficient quantity of condensed atmospheric air; over the valve of which cylinder the piston should closely enter to a proper depth, and be ready, on the action of a spring or trigger, to receive the whole force of the explosion, and thus violently force up the lever in the same proportion of power as is now done by steam. With a view to check the sudden shock the engine would thus receive, an arm spring of sufficient power might be applied to command the piston *inside*, and at the top of the cylinder. Another explosion from the chamber of condensed air would bring down the piston with equal force. With the view to keep this chamber (containing the condensed air) constantly charged to the very highest pressure, whereby an equally effective discharge could be made each moment, I propose that an air-pump should be attached to the engine, which could be worked by the common motion of the lever; or that a man should turn a wheel, which, by being connected with other wheels, springs, and proper machinery, the valve of the air-cylinder would be opened, and the air therein brought to act against the extremity of the piston, which would thus be forced up with extreme violence, thus raising the lever; in a second of time, the air pump could then force in as much as had escaped in the first discharge or explosion, and then, in equal and due time, the piston would be ready to receive a second explosion, of precisely the same power as the former, to bring it down. Thus, by a well-regulated and scientific movement, in rapid succession of powerful discharges of condensed atmospheric air, a force could be brought to act up and down fully equal to steam.

As the air-pumps would be by this constant work rendered very hot, which would heat the cylinder or air-chamber so much, that thereby the air might be dangerously rarefied, I propose that the pumps should be

encircled or enclosed in a case with a sufficient quantity of cold water, and which, by a simple contrivance, in a certain number of turnings of the wheel (equal to five minutes' time,) could be let off, and a fresh supply of cold water made to rush in from a reservoir above, to supply the place of the water heated by the barrel and action of the air-pumps. This cold water, so often repeated, or made to be constantly running off, would serve to condense the air in the cylinder, and enable it to receive a greater quantity than it otherwise would.

If it should be considered that one cylinder would be insufficient to force the piston up, and then down, there might be two cylinders, one to force it up, and the other to force it down; and if so, then the air-pump could be filling the one during the expulsion of a part of the air in the other; thus both would be kept alternately working. Each chamber might be capable of containing, upon the principle of the air-gun, as much air as would hold fifty discharges; *one only* of which discharges would be let off against the piston, on which the air-pump would instantly after force in a fresh supply of air to the very highest pressure: *thus every discharge would be of equal force.* The man who turns the wheel could have his movements regulated by a given scale, or pendulum; and it is not improbable that, in places where the engine could be placed in a fixed and steady position, the whole machinery could be worked (provided the air-chamber was previously charged) by a powerful clock and multiplied wheel movement, with heavy weights and maintaining power, which could be wound up every twenty-four hours; or after the attendant had left off the first explosion, the machinery could be so arranged, that, by the turning of a wheel, every succeeding explosion could be let off by the action of the engine itself on the trigger attached to the cylinder.

It is almost needless to observe, that if something like this plan could be carried into effect, the great expense of fuel would be saved, and safety ensured from fire.

If you, Sir, shall think this suggestion worthy of a page or two in your useful Magazine, you will greatly oblige me by inserting it.

I have the honour to be, Sir, your most obedient servant, W. H. C.

ON THE PROPERTY OF ANIMAL CHARCOAL TO PREVENT THE CORRUPTION OF WATER; BY A. CHEVALLIER.

Having been consulted by M. B. on the means of preventing the water of a pond in his garden from becoming offensive, I suggested the use of Animal Charcoal, and begged him to let me know the result of the experiment. A letter addressed to me on the 15th of November last assures me that the experiment has succeeded perfectly. The following is an extract of the letter:

"There is a pond, of nine feet in diameter and three feet deep, in the garden of M. B., the water of which is used for watering the garden. The pond is filled with water from a well; but, on the approach of autumn, it becomes offensive, and a mephitic odour arises from it.

"When it was annually cleaned out (an operation for which buckets were found necessary,) there was found in the bottom a putrid slime, which rendered this work very disagreeable, and *perhaps dangerous.*

"This year, on the 10th August, 1823, M. B. had 45 lbs. of animal charcoal, in powder, thrown into the pond; being careful to have it spread equally, by means of a basket of open wicker-work carried over the surface of the water: the powder which floated was soon precipitated to the bottom.

"This water was used for watering, and partly renewed as it became necessary. The waterings ceased about the middle of September. The water, which was then 20 inches deep, was left undisturbed, and has not been since changed; and although it is discoloured and even greenish, it is entirely inodorous—*thanks to the animal charcoal.*"

M. B. Having sent me a bottle of the water, I observed, on examining it, that it had neither a disagreeable smell nor taste; and that, during the eight days which have elapsed since its removal from its carbonaceous bed,

it has not undergone any change, and shows no signs of corruption.

The animal charcoal which has been thrown into the pond may, when taken out, be used as a manure; and this manure, which, by slow degrees, imparts to vegetables the substances which it has absorbed, is one of those which merit a most attentive examination.

THE ART OF TURNING.

SIR,—Amongst the various works that treat on practical mechanics, I have often felt surprised that so few have been given to the public on Turning, which is not only an extremely useful, but highly ornamental art. For though, of late years, many gentlemen have turned their thoughts to this subject, they have not condescended to publish to the mechanical world the fruits of their labours, and to treat the subject in that scientific manner which it demands: indeed, the only work that seems at all calculated for the practical mechanic in the higher department of the art, is one that is but very little known, but which deserves more consideration than it has hitherto met with—I allude to a publication, which came by mere chance into my hands very lately, entitled, "Specimens of Eccentric Circular Turning, with practical Instructions for producing correspoding Pieces in that Art," by Mr. Ibbetson. It is a work extremely well calculated to direct the workman how to execute those embellishments so often pointed out to his imitation in remarkable specimens of turnery, but which, unfortunately for the mere workman, are but little known, partly owing to the very expensive apparatus thought requisite, and partly to the want of a familiar explanation of the manner by which the various combinations of eccentric and concentric circles may be produced. I will venture to affirm, and, indeed, know by practical experience, that those expensive and highly finished engines are not absolutely necessary to the practical workman, whose object, in the tools he uses, is not elegance, but utility. Some time since, I constructed a rude lathe, that would perform all the different processes of elliptic and eccentric turning, at an expense not exceeding that of a common lathe, such as is sold at any of the tool-makers in town; and hence I am induced to believe, that the ingenious mechanic, were he aware of the methods used in the higher branches of the art, would find no difficulty in adding to any common lathe the necessary apparatus.

The work before me, of Mr. Ibbetson, furnishes precisely the information that is required; and the perusal of it, I am sure, will amply repay, not only the amateur, but the workman, and furnish hints for the formation of almost any eccentric figure wished to be produced. There is much to be admired in the beauty and accuracy of the illustrative plates, but much more in the very clear method pointed out to the workman to produce their counterparts. As the work itself contains so many practical problems, it may not, perhaps, be uninteresting to many of your correspondents if some notice is taken of them, and the various purposes to which this part of the art may be applied.

Our author gives six specimens of eccentric circular turning, in the like number of beautiful plates, which are all varied in such a manner, that every one of itself contains some new application of the tool and chuck used, and the whole together forms a series of examples, whereby the artist may form an infinity of various beautiful ornaments. An account of two or three of the specimens will give an idea of the whole. Plate 2. exhibits a specimen ornamented with an Etruscan border, produced by a multitude of small circles, arranged in the form known, particularly amongst cabinet-makers, by the title of the *à-la-Grecque* border, and appears at a little distance from the eye like a broad line. In the centre of plate 4. is a star with circular radii, formed by portions only of circles eccentric to each other. Plate 5. is, a specimen of that ornament which is so frequently seen in watch-cases, and has somewhat the appearance of a wheel with circular spokes, or radii, diverging from the centre. Indeed,

the whole of the specimens form a series of beautiful ornamental engraving, that may be applied with advantage to a variety of useful purposes, such as the embellishment of watches, snuff-boxes, trinkets, &c. It will also be highly useful to the engraver, to form borders, &c. to cards and cheque plates. The examples, moreover, are so selected, that they can be adopted either in part or as a whole.

If this notice of a work deserving of perusal should be the means of raising an emulation amongst our working turners to improve their art, and raise it above what it has too long been, rather as a secondary branch of mechanics, I shall feel happy to have rescued from mediocrity a class of workmen, that, I am sure, want only encouragement to raise their art to a level with others, to which it has hitherto but lent its aid.

If you think some drawings of the various chucks and tools used in the art of turning, would contribute to the advancement of an art of which I am a great admirer, I may, at some future period, send some, with practical illustrations of their several uses.* I am, Sir, yours, &c. G. A. S.

AMERICAN INVENTIONS AND IMPROVEMENTS.

A Mr. Alfred Churchill, of Batavia, United States, has invented a new Screw, which is thus spoken of in the American papers: "The screw is concave, and meshes, with admirable regularity, with the cogs placed in a circular wheel, which is moved with ease and rapidity, with the application of small power. To show its immense strength, it is only necessary to mention that the thread of the screw, in its evolution, presses at all times upon four of the cogs of a wheel containing eleven cogs, and may be so constructed, if necessary as to encircle five-elevenths of a circle."

The same Mr. Churchill is said to have invented a new and ingenious hydraulic model; "its power for raising water bids fair to excel any preceding principle, where the height required should not exceed the half of the diameter of the wheel used in lifting and discharging the water."

Another machinist called Salstonhall, of New York, pretends that he has discovered a new Wheel, adapted to all mechanical purposes, but more particularly to time-pieces, the powers of which exceed all belief. It is said to be "founded on the motions of the solar system," and to be "capable of taking any power, and to any extent;" its cause is "self-existing," and it can not only "set itself in motion," but "cause inanimate nature to revolve of itself;" and finaliy, it "will keep *a continued circular perpetual motion ! !*" Who can doubt that this is all a chimera? The *inventor* refers to the principle of the invention as "*recorded in the Patent Office of the United States;*" but we do not find that any of the scientific Journals of America have yet thought it worth the trouble of mentioning.

"We have examined," says the *Massachusetts' Spy*, "a sample of leather tanned in a new mode, by Capt. Charles Munroe, of Northborough, in this county, which is pronounced by competent judges to be of the first quaility. The sample is calf skin, and was tanned in ten days. By this process the expense is somewhat reduced, and the capital employed may be turned much oftener than in the old way. Sole leather may be tanned three times, upper leather six times, and calfskins nine times in a year, in regular business, with no danger of failure or injury to the leather. The liquor for tanning is used cold."

BROWN'S GAS ENGINE.

A Company, upon a large scale, has been formed in the City, for the purpose of applying Mr. Brown's Gas Engine to the propelling of wheel carriages. The capital is two hundred thousand pounds, in shares of ten pounds each, of which ten per cent, is to be deposited in advance, and no more will be required until the pro-

* We shall be happy to receive and give them a place.

jectors shall have driven a carriage from London to York, and back again, at the rate of ten miles an hour. All the shares are already subscribed for, and they expect to be enabled to start their first carriage in about two months after this date.

We still look upon Mr. Brown's invention as one of the first discoveries of the age in which we live, and we have not the slightest doubt of the success of the experiment. The power applied is so portable, that a man of ordinary strength may carry an engine of two-horse power upon his back; and the quantity of power, therefore, to give velocity, need only be limited by the necessity of studying the safety of the passengers and the public at large. If it is found that a carriage can travel, without danger, at the rate of twenty miles an hour, the necessary power can be applied quite as easily as if it were only required to propel it at the rate of ten.

IMPROVEMENTS OF LONDON.

Sir,—In one of your late Numbers, a Correspondent, who signed himself "Julius," has given an outline of a plan for rebuilding London after the great fire, by Sir Christopher Wren. The idea appears to have been a magnificient one, and worthy of the genius that proposed it; and it is much to be regretted that the opportunity was lost, perhaps for ever, of carrying it into complete effect. I remember to have once met with a book published by a Mr. Gwynne, and dedicated to his Majesty, somewhere about the commencement of his reign; being a "Plan for the Improvement of London and Westminster;" and which, from the recollection I have of it, must have furnished hints for many of the improvements since made, and some of which are now in progress. The improvement of such a metropolis as London, which may now, without the imputation of notional vanity, be considered the emporium of the world—the centre of commerce, arts, and elegancies—is surely an object highly deserving the attention of Government. And if only the sum of three or four millions were devoted to that object, in the progress of the next five-and-twenty years, in carrying into effect some well-adapted and elegant plan for improving the metropolis generally; it would surely be well laid out, and an expenditure which the most rigid economist of the public money would not grudge, if so applied. The Athenians, I believe, dedicated a tenth of the spoils of war to the embellishment of their city; by which they made it the wonder of the world, and the resort of the wealthy and curious of all nations, whose expenditure would doubtless make an ample return to the inhabitants of that superb city for the cost of its embellishment. Our Government hitherto unfortunately have managed things differently; but let us hope that it is not too late to expect of them some attention to this truly national object; and that they will by their example, give an impulse to the national taste, which shall extend itself all over the country. Then may we expect, in another century, if the prosperity of the country continue, that our children's children will see London another Athens, in elegance of arrangement and splendour of decoration, with a tenfold increase of magnitude. Should any of your correspondents possess the book alluded to, and will favour the public with an outline of Gwynne's plan, it cannot fail of being acceptable. It will show how far it has been acted upon in our day, and will prove, that however long suggestions of this nature may lie dormant, in the end it is not labour spent in vain to point out the means of judicious national improvements; and that though the projector may have the mortification to see his plans neglected and apparently forgotten, time and circumstances may at least combine to bring them into notice, and ensure their being carried into effect.

J. N.

CHEAP PROCESS FOR MAKING THE SCHWEINFURT GREEN DYE.

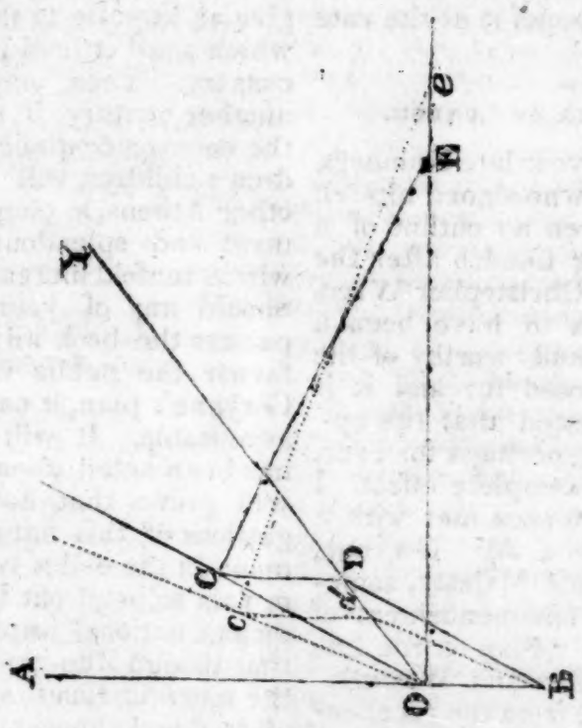
The Schweinfurt Green Dye, which has recently acquired great reputation on the Continent, has been analysed by two chemists, M. Braconnot

and Dr. Liebig who have not only discovered its constituent elements, but pointed out how it may be compounded The process of Dr. Liebig, which seems the simplest, we extract from the "Annales de Chimie."

"Dissolve, in a copper kettle, by heat, *one* part of verdigris, in a sufficient quantity of pure vinegar, and add to it an aqueous solution of one part of white arsenic. A precipitate of dirty green generally forms, which must be renewed by adding more vinegar, or till the precipitate is perfectly dissolved. After boiling this mixture, a granular precipitate will, in a short time, form, of the most beautiful green colour, which, being separated from the liquid, and well washed and dried, is the required colour. If the liquor, after this, contains copper, more arsenic may be added; and if it contains an excess of arsenic, more copper may be added, and the process repeated. When the liquid contains an excess of acetic acid, it may be employed in dissolving more verdigris.

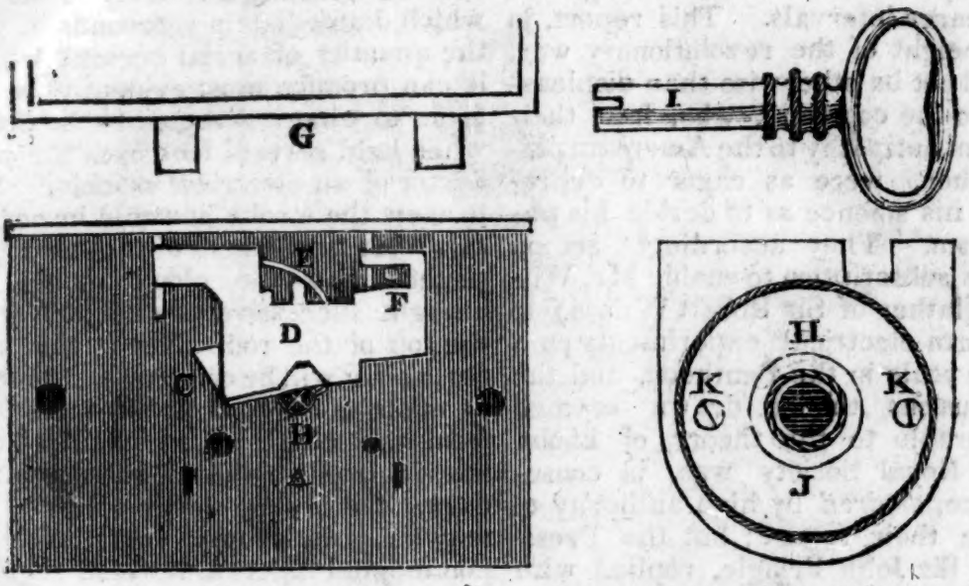
"The green prepared in this way has a bluish shade; but the arts often require a deeper shade, somewhat yellowish, but of the same beauty and elegance. To produce this, dissolve a pound of common potash a sufficient quantity of water, and having added to it ten pounds of the colour prepared as above, warm the whole over a moderate fire. The mass will soon acquire the required shade. If it is boiled too long, the colour will approach to Scheele's green; but it always surpasses it in beauty and splendour."

GEOMETRICAL EXERCISE.



Let O Y be any fixed line drawn within the right angle A O X from the vertex O, and B be any fixed point in A O produced. From O let any line O C be drawn within the angle A O Y, and to it a parallel B D through B, meeting O Y in D. Complete the parallelogram B C, and from C draw C E perpendicular to O C and meeting O X in E. Then it is required to prove that the point E is nearest O, when O C bisects the angle A O Y; that is supposing O C in the figure to bisect A O Y accurately, and O *e* to be determined similarly with O E, but from a line O *c* which divides the angle A O Y into unequal parts, it is required to prove that O E is less than O *e*.

ELLINGTON'S PATENT LOCK.



SIR,—I take the liberty of submitting, for your inspection, a Lock (for which I have obtained a patent,) which, in itself, I may say (with the greatest mechanics who have seen it,) is the most secure and simple now in use.

Description of the Lock.

A is the brass plate of the lock.

B the pin which goes into the pipe of the key, having at the lower part a circular piece of brass, which revolves round it; this has four slits to receive the corresponding parts of the key.

C the tumbler.

E the spring to keep down the bolt.

F the pin to secure the bolt in its place.

G the staple (double link.)

H the cap.

I the key.

K K the screw-holes of cap.

J the bush, or pipe.

The advantages of this lock will be obvious from the description. Instead of a great heavy key, with a large bit of iron (called a bit,) being required, as in locks of the kind now in vogue, you have a key so small, that it may be attached to the watch-chain; nor is there any possibility of the bit breaking in the lock, as is sometimes the case, and valuable articles of furniture being thus destroyed or damaged.

In the next place, there are no wards to break or bend; the brass circular revolving talent answers the place of the wards, shooting the bolt as it goes round. The slits answer the purpose of keeping out any false pipe, or skeleton-key, which might be introduced. The cap of the lock is made with a large bush, similar to Mr. Bramah's patent, so as to leave no possibility of a picker entering.

The price of Mr. Bramah's lock is 8s. 6d.; but the utmost which can, with propriety, be charged for mine, is only 1s. 6d.; while it is equally, if not more, secure. Any of my make I will warrant beyond all possibility of being picked.—I remain yours, very respectfully,

SAM. ELLINGTON.

Wolverhampton, July 24, 1824.

INUTILITY OF THUNDER-RODS.

The utility of Thunder-Rods has, for many years, been an universally admitted fact among philosophers; so much so, that one of the most celebrated scientific controversies in England turned on the important question, whether, in order to make the most of them, they should be terminated by *points* or by *knobs?*

The powder magazine at Purfleet, though guarded by pointed conductors, happening, in 1778, to be struck by lightning, the Privy Council made an application to the Royal Society to investigate the cause of this accident. A committee was accordingly named of its ablest members, who, still adhering to the hypothesis of

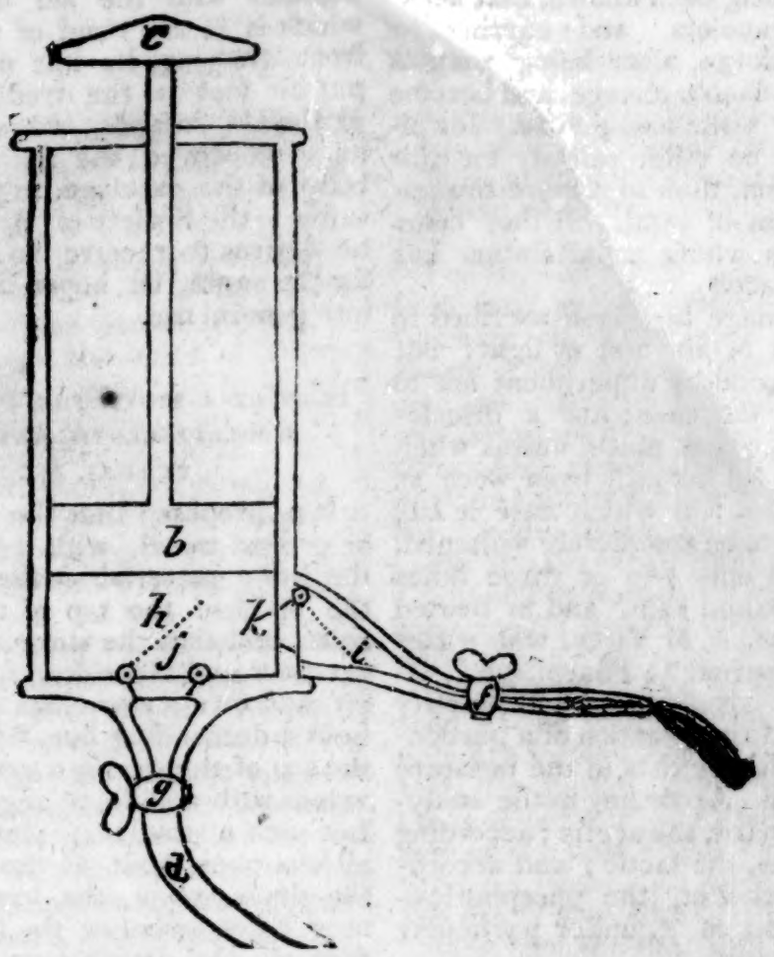
Franklin, only recommended additional pointed conductors to be placed at nearer intervals. This report, in the height of the revolutionary war, could not be otherwise than displeasing to the courtiers, who, from their violent antipathy to the American philosopher, were as eager to depreciate his science as to deride his patriotism. They accordingly set on foot a subscription to enable Mr. Wilson (father of Sir Robert Wilson) to perform electrical experiments on a large scale in the Pantheon, and the conclusions thence drawn seemed favourable to the theory of knobs. The Royal Society was, in consequence, *desired* by high authority to revise their report; but the President, Sir John Pringle, replied with some warmth, that *he could not change the laws of nature!* Soon after, the worthy President was given to understand, that, *since he could not do that*, he had better resign; and he was, in fact, so worried on all sides, on account of his scientific integrity in this matter, that he was driven from the Chair in disgust.

Such sticklers for points and knobs would have looked amazed to be told, as we now are, by a person of no less authority than Professor Leslie, that rods of any kind are nearly altogether useless. The Professor, in a paper, which he has written on the subject, in the *Edinburgh Philosophical Journal*, lays it down as a principle not to be disputed, that electricity is never communicated in any perceptible degree to a remote and unconnected body, but by means of a current of air; and, assuming this to be the fact, he thus proceeds to refute the supposed efficacy of lightning conductors:—

The air, which streams in all directions from the cloud, is dissipated among the more remote portions, and thus gradually communicates its electricity. Hence, from the wide dispersion, owing to the distance, the electricity of the air at the surface of the earth must be weak; and, even in the midst of the storm, the electrometer is less affected than if placed only a yard behind the prime conductor. Yet the action of the thunder-rod is confined entirely to the air which immediately surrounds it, and the quantity of aerial current which it can produce must evidently be inferior to what is directed to the point, when held several feet from the conductor of an electrical machine. But to avert the stroke, it would be necessary that the whole air between the surface and the cloud should be brought successively in contact with the top of the rod. Nor is this all; for the air will be constantly replaced by other electrified portions emitted from the cloud. The effect of the thunder-rod is, therefore, comparatively, but a drop in the ocean.* It may be easily shown, that, however pointed and tapered, it would require a thousand years to guard at the distance of a hundred yards; if terminated with a knob, it might take ten thousand years. Such are the vaunted performances of thunder-rods, and such the advantages of their different forms! Nor can we appeal to experience; it never can be proved that thunder-rods have produced beneficial effects, but several instances may be cited where they have afforded no sort of protection. Nay, we shall be convinced, that fully an equal proportion of the buildings armed with such supposed safeguards have been struck with lightning. But if thunder-rods are useless, they are also innocent; and that they provoke the shaft of heaven, is the suggestion of superstition rather than of science. The cloud exerts an attraction, indeed, upon the suface of the ground, but the force depends solely on the distance, and is not, in the least degree, affected by the shape or quality of the substances below. It rolls towards the nearest and most elevated objects, and strikes indiscriminately a rock, a tree, or a spire.

* It appears, from the experiment with the heated ball, (an experiment to prove that, by means of heat, a ball may be made an equally good conductor with a point,) *that a good kitchen fire has more efficacy in preventing a house from being struck*, than a whole magazine of thunder-rods. Hence one of the reasons why a thunder-cloud diminishes so fast in passing over a large city.

IMPROVEMENT OF JUKES' POISON-EXTRACTING PUMP.



Passing through the Strand, a few days ago, I saw, in a surgeon's instrument maker's window, the newly invented Pump for extracting Poisons from the stomach. The principle of it is admirable, though, like most new inventions, it is, I think, susceptible of improvement.

In the one I saw, the communication between the pipe leading to the stomach and what I shall call the ejectment pipe, with the body of the syringe, is cut off alternately by means of *two* cocks. Now, unless the syringe is worked by at least two persons, this must cause a great inconvenience to the patient from the time the pipe remains in the stomach; but, by employing two small valves instead of the cocks, it might easily be managed by one person only, and the time lost in opening the cocks saved. The following is a short description of the instrument, with the manner in which I propose that the valves should be placed:

a is the cylinder.
b the sucker.
c the handle.
d the flexible pipe leading to the stomach.
e the ejectment pipe.
f and *g* the two cocks as used at present.
j and *k* the two valves, with hinges, to allow them to move to the dotted lines, *h*, *i*, and there stop them.

From the above sketch it will easily be seen that, in raising the sucker, it will open the valve *j*, and at the same time keep the valve, *k*, firm in its place, and that, in pressing it downwards, the contrary will be the case; by which means the trouble with the cocks will be avoided.

Perry-street, St. Pancras. F. H.

P. S. I conceive this instrument might also be advantageously employed in the recovery of persons apparently drowned.

DISCOLORATION OF CORAL ORNAMEETS.

It has long been known, that necklaces, bracelets and earrings of Coral, undergo, after being worn, a very remarkable change, and become extremely white and porous. Jewellers have no other remedy for this deterioration, than to remove the upper stratum of coral, till they come to a depth where no alteration has been produced.

This change had been ascribed to the action of air and of light; but this was found by experiment not to have been the case: and a discoloration never took place, unless when the coral had actually been worn as an ornament; in which case it has sometimes been completely whitened, when used only two or three times upon the naked skin, and in heated apartments. A M. Virey, who writes in the "Journal de Pharmacie," ascribes the discoloration and porosity of the coral to the action of a particular acid which exists in the moisture of the body. According to the analysis of Thenard, the acetic; according to Berzelius, the lactic; and according to Berthollet, the phosphoric—acid is found in it, under particular circumstances.

In order to prevent this deterioration of coral, when used for the purposes of jewellery, M. Virey remarks, that it will be sufficient to impregnate it with a fat body, which will defend it from the immediate action of weak acids; and, for this purpose, he recommends that the coral should be digested in warm oil, or melted wax, so as to enable it to resist the action of the acid to which it is exposed.

SELF-MOVINC CARRIAGE.

Mr. D. M'Donald, of Sunderland, informs us, that he has invented a "Self-moving Machine" for travelling on roads, which has carried seven persons. "It is propelled by means of treddles: a man sits behind working the same, and there is a fly-wheel operating upon two cog-wheels, which operate upon a square axle. You will, perhaps, think the man behind has hard labour—not so; from the velocity of the fly-wheel, together with the aid of a lever, which is in the hand of a person in front steering, he has not often to put his feet to the treddles." Mr. M'Donald intends, when he shall have improved the friction of the body of the carriage, to present the same so the Society of Arts; and, as he desires to receive no emolument for the same, he hopes it will come into general use.

PLAN OF A STOVE FOR PAPER AND WOOLLEN-CLOTH MANUFACTURERS, &c.

It is proposed that the stove shall be of cast metal, with a chimney of the same material continued up to the level of the top of the drying-room, and that the stove shall have a fire-door and close-door for the ash-pit, and an aperture into the ash pit, from a descending flue, brought from the top of the drying-room, and provided with a slide or regulator in it. Let such a stove be placed within an air-chamber, built at the outside of the drying-room, the base of which must he on or below the level of the floor of the drying-room, and extended to its height, four feet in diameter, inside measure, and to be there contracted to a suitable size for a chimney, and then continued to any desirable height. A space must be left open at the base of the air-chamber, of the size of the fire and ash-pit doors, to supply the stove with fuel from the outside.

On the side of the air-chamber let there be a descending flue of brick-work, connected at the top and brought down to the floor of the drying-room, and there communicating with a horizontal brick flue, which should run along the centre of the room with branch flues on both sides, provided with regulators in all directions, for admitting warm air into all parts of the room.

The air-chamber has an opening, 18 inches square at the bottom, below the level of the stove, for admitting the air from the outside, which, by coming in contact with the stove and its chimney, will become rarefied, and heated.

The stove is supplied with air, for the consumption of the fire, through its descending flue from the top of the drying-room, when its regulator is open; for, by the stove-chimney extending, say 10 or 15 feet above the height of the descending flue, the fire will have the effect of causing the steam and rarefied air to descend down that flue, acting on the principle of a syphon, when all other communication to the stove is cut off, which air must be replaced by a supply of air into the drying-room, and (the door and windows being perfectly close) can only be had through the regulators in the warm-air flues from the air-chamber; thus producing a constant and regular supply of warm air throughout the drying-rooms. When the slide or regulator in the descending flue, connected with the stove, is closed, the fire will go out, so that no more fuel will be consumed than circumstances require.

Yours, respectfully,

Newcastle-on-Tyne. W. H.

SHORT RULES FOR CALCULATING THE PRICE OF TIMBER.

To compute the value of deals, the price per hundred being ascertained.

RULE.—Double the price in pounds per hundred, and call the product pence, which is the value of one deal.

EXAMPLE.—Deals cost 36*l.* 10*s.* per hundred, what is the value of one deal?

36*l.* 10*s.*
2

The value of one deal in pence . . . } 73*l.* 0*s.* or 6*s.* 1*d.*

To compute the value of deals per hundred, when the value of one is ascertained.

RULE.—Reduce the price of one deal to pence, call the product pounds, and divide by 2.

EXAMPLE.—A deal cost 6*s.* 1*d.*, at what rate is that per hundred?

6*s.* 1*d.*
12

2) 73*d*, to be called pounds,

One-half of which, or } 36*l.* 10*s.* price per hundred

A PERMANENT BUFF OR NANKEEN DYE, FOR MUSLIN, LINEN, COTTON, AND, PROBABLY, SILK OR WOOLLEN, FROM HORSE CHESNUTS.

For the buff colour, take the whole fruit, husk and all, when quite young (perhaps about as large as a small cherry;) cut it small, and put it into cold soft water, with as much soap as will just cloud or discolour the water. When deep enough, pour off the clear part, and dip whatever is to be dyed, till it is the colour required.

For the Nankeen colour, take the *husks* of the fruit only; cut or break them small; steep them in soft water, with soap as above, and dye in the same manner. The *husks* may be used for the buff dye, after the kernels are formed; but it is only when they are almost imperceptible that the whole fruit is used, and the brightness of the buff colour diminishes as the husk ripens, till, when quite ripe, the dye is most like nankeen.

It is thought that this, which was discovered by accident many years ago, is not generally known; and that being a permanent, cheap, and easily procured dye, it may be useful, and supersede, in some measure, foreign dyeing stuff. The soap used was white or brown Windsor, and common mottled, whichever was at hand. Hot water seemed not to answer so well as cold in making the dye, as it was less bright; but once dyed, nothing ever was found to efface the colour. A dyer would easily find the proportions, and, perhaps, some alkali, instead of that of the soap. But if tried *at all*, it is *particularly requested* that the directions here given may be *strictly followed* at *first*, as they are *exactly given* by the person who is thought to have made the discovery. Muslin, linen, cambric muslin, and calico, were tried; it did not discharge the colours of printed cottons.

The husks may still be gathered during this month and most of October. Whether any use can be made of them when dry, or whether the dye can be made and kept till the young chesnuts are ready, has not been ascertained.

PROGRESS OF ART.

The difference between a nation with and without the arts may be conceived, by the difference between a keel-boat and a steam-boat combatting the rapid torrent of the Mississippi. How slowly does the former ascend, *hugging* the sinuosities of the shore, pushed on by her hardy and exposed crew, now throwing themselves in vigorous concert on their oars, and then seizing the pendent boughs of overhanging trees! she seems hardly to move; and her scanty cargo is scarcely worth the transportation! With what ease is she not passed by the steam-boat, laden with the riches of all quarters of the world, with a crowd of gay, cheerful, and protected passengers, now dashing into the midst of the current, or gliding through the eddies near the shore! Nature herself seems to survey with astonishment the passing wonder, and, in silent submission, reluctantly to own the magnificent triumphs, in her own vast dominion, of Fulton's immortal genius!—*Mr. Clay.*

GUNTER'S LINE.

SIR—Your Correspondent, "Unit," inquires, "where are 32 and 16?" Let him open the sector, and lay it before him, with that line uppermost, marked N, on the right. In the line marked N find the first 8 from the left, the which, to be readily found, is exactly 4 inches and ½ from the left extremity of the sector, or 1 inch and a half from the opening of the sector towards the left extremity. The 8 being found, the next figure towards the right is a 9, and the next a 1; but the 1, in the example before us, must be called 10; the next a 2, which must be called 20; the 3 must be called 30; and the 4 must be called 40; and so on till the 10 at the end must be called 100. But now let him look back to the second 1, which I before said must be called 10; "Unit" will find the space between the second 1 (10) and the second 2 (20) divided into 10 parts. I may here remark, that 6 parts of the 10 are on the left half of the sector, and the 4 parts on the right half of the sector; the parts being divided by the opening of the sector. "Unit" may now refer to the 1 next to the 9, which one is to be called 10; the first subdivison must be called 11, the second subdivision to be called 12, the third subdivision to be called 13, the fourth subdivision to be called 14, the fifth subdivision (which is easily distinguished by its being made twice as high as the other subdivisions) to be called 15; the sixth on opening of the sector, to be called 16 ("Unit" has now found the required 16;) the seventh subdivision to be called 17; the eighth subdivision to be called 18; the ninth subdivision to be called 19; and the 2 to be called 20. But there are also 10 subdivisions between the 2, at which we have arrived, and the 3, which will make the 3 to be called 30 as before. There are also 10 subdivisions between the 3 (30) and the 4 (40;) but 40 exceeds the number in "Unit's" data, his number being 32; let him then take *two* only of the subdivisions, on the right of the 3, which is 30, and the two subdivisions will be called 32; 16 being at the opening of the sector. That "Unit" may not possibly mistake the 16, it is exactly 6 inches from either end of the sector. (I have presumed his sector to be 12 inches in length,) and the 32, 4 inches and a half from the right extremity towards the opening of the sector or it is 1 inch and a half from the opening of the sector towards the right extremity of the sector. If "Unit" places one foot of the compasses at 8, (having previously taken the extent of 3* inches in the compasses,) that extent will reach to two subdivisions past the 3 (30,) which two subdivisions will make 32; let him bisect that extent, and the half extent will be equal to 1 inch and a half: that extent, when applied forward from the 8, will point out the opening of the sector, which is 6 subdivisions past the

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* The reason I mention 3 inches is, because I found the extent from the place of 8 to the place of 32 corresponds exactly with 3 inches in length.

1, which is called 10, making together 16; and if applied backwards, with one foot of the compasses placed on the second subdivision past the 3 (30,) it will point out the opening of the sector (16) as before. Let "Unit" try the mean proportional of 12 and 48, thus: place 1 foot of the compasses on the 2d subdivision on the right side of the 1, which in the last example was (as in this) called 10, and extend till the other leg reaches to 8 subdivisions on the right of the 4 (40,) which is the place of 48; bisect that extent, and the half extent, with one foot on the second subdivision on the right of the 1 (10,) the place of 12, will reach to four subdivisions on the right of the 2 (20,) which is the place of 24, the mean sought; or, if applied backwards, one foot must be placed on the eighth subdivision, on the right of the 4 (40;) it will point out four subdivisions on the right of the 2 (20,) as before, making 24 the mean sought.

I hope I may be excused for this long article; but I was afraid your Correspondent, "Monad," in his answer, was not so explicit on the subject as "Unit" required. I am, yours, &c. W. PICKETT.

Ratcliff, Sept. 10, 1824.

P. S. Dolland, in St. Paul's Churchyard, will supply "Unit" with a pamphlet on the subject for sixpence.

ANSWERS TO QUERIES.

QUODLIBET'S PROBLEM.

SIR,—Looking at your last Number, I find a Correspondent answering a query, which I assume to have been this:—Suppose a square divided into any number of equal parts, and one quarter of these parts being taken away, how shall the remaining three-quarters of the square be divided into five equal and similar parts? Your Correspondent gives one answer—I shall give another: thus—Let the square be divided into 60 parts, by drawing two lines through it one way, and nineteen the other. The fifth line will bound the one quarter of the whole, and every third line will bound one-fifth part of the remaining three-quarters, and the five pieces will evidently be similar. To divide three-quarters of the square into any number of similar pieces at pleasure, if the number be *odd*, draw *two*—if *even*, *one* line through the square in one direction, and one line less than the number of similar pieces it is proposed to make, and one third of that number more in the other direction. If a fraction occur, you must get rid of it, as follows:

EXAMPLE.—In the above query, the number of similar pieces being odd, draw two lines one way, $5 + \frac{5}{3} = 6\frac{2}{3}$, and, to get rid of the faction, reduce to an *improper* fraction, and take the *nominator*, which, in this case is 20: one less (19) is the number of lines to be drawn through the square the other way. Again, suppose you wish to divide the three-quarters into six similar parts, then bisect the square one way, and draw $6 + \frac{6}{3} + 1 = 7$ lines, the other way; this square will, consequently, be divided into sixteen parts, and the second line will bound the quarter taken away, and each succeeding line one-sixth of the three-quarters to be divided.

I am, &c. J. F.

High-street, Southwark,
Sept. 20, 1824.

ANSWERS TO INQUIRIES.

DECIPHERING INSCRIPTIONS.

SIR,—The following is the plan adopted by the celebrated antiquary, Mr. Brayley, in decyphering the inscriptions on the tombs in Westminster Abbey.

Take a sheet of tissue paper; hold it against, or lay it on, the stone, over the inscription; then take a rubber made of cloth, rolled up to about an inch in diameter, dip the end in powdered black-ball, rub it gently over the paper where the letters are, and the inscription will appear.

Sept. 13, 1824. T. E—TT.

P. S. I have enclosed a specimen of paper, and an inscription upon it, which is at the service of "Investigator," providing he will return it, as it is the only one I have left. By inspection he will perceive the process. [It is left with our Publishers for "Investigator's" inspection.—Edit.]

APPLE BREAD.

A very light, pleasant bread is made in France by a mixture of apples and flour, in the proportion of one pound of the former to two of the latter. The usual quantity of yeast is employed as in making common bread, and is beat with flour and warm pulp of the apples after they have boiled, and the dough is then considered as set; it is then put up in a proper vessel, is allowed to rise for eight or twelve hours, and then baked into long loaves. Very little water is requisite; none, generally, if the apples are very fresh.

CHINESE METHOD OF MAKING SHEET-LEAD.

The Sheet-Lead which comes from China is manufactured in a way not generally known in this country. The operation is conducted by two men. One is seated on the floor, with a large flat stone before him, and with a moveable flat stone-stand at his side. His fellow-workman stands beside him with a crucible filled with melted lead, and having poured a certain quantity upon the stone, the other lifts the moveable stone, and dashing it on the fluid lead, presses it out into a flat and thin plate, which he instantly removes from the stone. A second quantity of lead is poured in a similar manner, and a similar plate formed; the process being carried on with singular rapidity. The rough edges of the plates are then cut off, and they are soldered together for use.

NEW PATENTS.

To Chas. Random Baron de Berenger, of Target Cottage, Kentish Town, in the Parish of St. Pancras, Middlesex, for his improvement as to a new method or methods of applying precussion to the purpose of igniting charges in fire arms generally, and in a novel and peculiar manner, whereby a reduction of the present high price of fire-arms can be effected, and the priming is also effectually protected against the influence of rain or other moisture; such invention and contrivances rendering the precussion principle more generally applicable even to common pistols, blunderbusses, and muskets, as well as to all sorts of sporting and other guns, by greatly reducing not only the charges of their manufacture, but also those impeding circumstances which persons have to encounter whilst loading or discharging fire-arms when in darkness, or whilst exposed to wet, or during rapid progress—serious impediments which soldiers and sailors, and consequently the service, more particularly and most injuriously experience.—Dated 27th July, 1824.—Two months allowed to enrol specification.

To Thomas Wolrich Stansfeld, of Leeds, Yorkshire, merchant, for certain improvements in power looms and the preparation of warps for the same.—27th July.—Six months.

To Charles Jefferies, of Havannah Mills, near Congleton, silk-thrower, and Edward Drakeford, of Congleton, watch-maker, both in the County of Chester, for their method of making a swift and other apparatus thereto belonging, for the purpose of winding silk and other fibrous materials.—29th July.—Two months.

To William Johnson, of Great Tothan, Essex, gentleman, for a means of evaporating fluids, for the purpose of conveying heat into buildings for manufacturing, horticultural, and domestic uses, and for heating liquors in distilling, brewing, and dyeing, and in making sugar and salt with reduced expenditure of fuel.—5th August.—Four Months.

TO OUR READERS AND CORRESPONDENTS.

"A Mechanic" will please to accept our thanks for his valuable hints; they shall be turned to account.

Communications received from—T. I. Simpson—A Warm Supporter—Mr. Ellington—J. Tailor—Tenacity—T. B.—An Admirer—W. Merrifield—Old File—Philo-Gunter—Pry—Jack Horner—S. P.—A Looker-on—Z. A.—Integritas—M.—D. M'F.—A Schoolmaster—N. O.—Bredy—W. Young.

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